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professors of the Protestant Episcopal faith, the Luganda language has been reduced to writing, the whole Bible has been translated, the people support their own ministry, and have even established missions among the tribes around them. The work now covers so much ground that the white missionaries devote themselves almost entirely to instructing the native teachers and superintending the work done by them. The medical feature of the work is very important. Some of the most interesting among the pictures relate to scenes in school and at the book shops, where natives are exchanging cowries for books. One of the maps shows the chain of mission stations that has been established across Equatorial Africa.

*The Stone Reefs of Brazil, their Geological and Geographical Relations, with a chapter on the Coral Reefs. By John Casper Branner. Bulletin of the Museum of Comparative Zoology at Harvard College, Vol. XLIV; Geological Series, Vol. VII.*

These reefs are not coral, though they have often been so reported, but to casual observation they resemble coral reefs, and are found along much of the Brazilian coast. They have had an important influence on human occupation, and, therefore, are distinctly geographic in their significance; for Pernambuco, Rio Grande do Norte, Santa Cruz and other ports owe existence to their protection. Among the characteristics summarized are these: The reefs consist of indurated sand; they are low and flat-topped, being exposed at low tide; they are nearly straight, and are formed by the consolidation of beach-sands in place. Corals sometimes grow on the reefs, and in other cases the reefs are superimposed on dead corals.

The author's work was begun in 1875-77, continued in 1881-83, and concluded in 1899, the last visit being made through Dr. Alexander Agassiz. The work has been done under great limitations, because there is no good topographic map of the Brazilian coast.

The introduction is followed by an account of the geology of this shore. For nearly two thousand kilometres there is a foundation of ancient crystalline rocks, cut by eruptive dikes and covered by sediments of Cretaceous and Tertiary Age. At one point is an intermediate series, which may be of Paleozoic Age. A considerable section describes the reefs in detail. The rocks of the various stone reefs contain fossil shells of mollusks that now live along the Brazilian shore-line; and yet the rocks are hard and sometimes take on a quartzitic character. In some cases the surfaces are smooth, and in others fitted and etched until exceedingly

ragged and even difficult to traverse. Borings of an English engineer, in 1874, showed that the Pernambuco reef has but three or four metres in thickness of the hard rock, which rests on sands, clays, marl, and shells. The various reefs are abundantly illustrated in the text with sections, maps, and views.

There is an extended discussion of the elevations and depressions of the shore-line. Evidence, however, does not point to such changes since the discovery of the country. Recent changes can be explained by reference to ordinary operations, without movements of oscillation. Both upward and downward movements are recorded for prehistoric times. Only the induration of the sands composing the reefs has permitted their preservation. This hardening is due to the infiltration among the sand grains of carbonate of lime. One sample of the rock shows 35.94 per cent. of matter which was soluble in concentrated hydrochloric acid. About six-sevenths of this soluble portion was lime carbonate. Some of this large amount was not due to infiltration, but to the presence of fragments of shells and corals as a part of the sand originally deposited. The origin of the cementing material is discussed at length, but may be considered as of greater interest to the geologist than to the geographer.

The reefs are believed to have been in process of formation since the depression of the coast in early Pliocene times. They are close to the adjacent lands—parallel to them, and of low altitude. The conditions of shore-lines are so subject to change that such reefs could hardly have survived for long periods. Some twenty-five pages are devoted to an annotated bibliography of the subject. Little value is ascribed to the papers named, except those of Darwin, Hartt, Rathbun, Hawkshaw, Fournié, and Béringer. The old maps of the coast have not been assembled, because they are conventional, and fail to show the forms and extent of the reefs.

As indicated in the title, the author has included an account of the coral reefs of this shore. Both the fringing and the barrier reefs are represented by examples, and it is regarded as probable that some stone reefs have been covered and concealed by the corals. The volume is concluded by nearly one hundred plates, most of them reproduced from photographs. The non-technical reader, at least, will find these a most important aid in gaining true notions of these features of the Brazilian coast. It would be much to every reader's convenience if the titles of chapters had been used as running headings throughout the volume. A. P. B.